PUBLIC DISTRIBUTION SYSTEM (PDS) AND FOOD SECURITY: A STUDY ON FOOD AND NON-FOOD EXPENDITURE OF BPL FAMILIES IN KARNATAKA

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1. Introduction

1.1 Background

The outbreak of the Second World War and famine were marked as the beginning of an era of uncertainty in rising price and inadequate food supply. Having suffered from this, for instance, India had to depend on U. S to import wheat under PL 480 Agreement. The import was as high as 60 per cent and went up further to 88 percent in 1961 (Gulati & Krishnan, 1975). This led to the inculcation of an idea of institutional approach which was then complemented by the green revolution in India. But before this, the system of rationing was started in 1939 in Bombay by the British Government as a measure to ensure equitable distribution of food grains to the urban consumers in the phase of rising prices (Pal, 2011). In addition, India along with other UN member states have made three major commitments to eradicate world hunger: Rome Declaration on world food security at World Food Summit in 1996, Millennium Development Goal (MDG 1) 2001 and Sustainable Development Goal (SDG 2) 2015. Though the countries are committed, it is the fact that about 795 million people in the world – just over one in nine were undernourished (FAO, 2015). Ever since the green revolution of the 1960s in India, there was an output uptrend which is in fact sustained by the introduction of yield-enhancing technology, supportive services, and the infrastructure. Consequently, the country's total output of food grains has increased to 277.49 million tonnes from 51 million tonnes in 1951 (DAC&FW, 2017). Agricultural growth has been volatile over the past decade, ranging from 5.8% in 2005-06 to 0.4% in 2009-10 and -0.2% in 2014-15. Although the net availability of food grains has declined by 11 percent since 1991 (*Annual Policy Review 2015-16*, 2016). The government has been trying to bridge the gap by implementing various schemes domestically to enhance the productivity and also entering into various international agreements to import adequate food grains.

Since Independence, Government of India has been trying to be pro-poor by implementing various policy initiatives including food subsidies. But the fundamental question is ‘did poor gain from all these attempts?' Almost the entire government expenditure on subsidies being directed towards the common man's essential items, as claimed by the Minister of State for Finance then, the truth is that almost none of the expenditure, including that on even the so-called food subsidy goes to benefit the poor or the 'common man' (Chaudhuri, 1986). The bulk of the essential consumer items being distributed through the PDS network are being consumed in urban areas and quite a bit of that by households whose income is above the poverty line. The village population for whom certain essential commodities are dispatched is uninformed about the items, price, quantity, and quality(Jain et al., 1989). In order to correct such type of imperfections in the market dynamics, generally, two broad approaches are practiced viz., radical changes in the socio-economic structure and positive intervention of the state through public policy. The Public Distribution system (PDS) belongs to the latter category. It is a vital programme to correct the market imperfections and to ensure distributive justice (Ojha, 1987). The effectiveness of the public distribution to meet the consumption requirements of the poor is linked with proper identification of the target groups and minimization of leakages (George, 1984). However, food sufficiency does not automatically reflect food security for the entire population at all the times though it makes country to be secured of adequate food supply at the micro level. India accounts for overall low performance in ensuring food security- it has the second-highest estimated number of undernourished people in the world (FAO, 2015). In fact, the real issue is not only the availability of food but also of its affordability by the poor. From this point of view, the concept of food security has encompassed livelihood security and poverty alleviation as a means to ensure economic capacity to afford food. It is significant to note that the Indian policymakers have treated food security as a national priority and, therefore, it has become

the central point of the food policy. The food security system, thus, went beyond the food sufficiency to buffer stocking and distribution as well. For this purpose, an extensive food management system has been evolved which primarily take care of three elements: procurement of food grains at minimum support price, storage of food grains at warehouses and distribution of food grains through the public distribution system (PDS). To tackle the problem of poverty and inequality, different approaches have been adopted from time to time. On the one hand, employment generation programme as a means of alleviating poverty is going on; on the other hand, policy initiatives such as Targeted Public Distribution System (TPDS) and National Food Security Act (NFSA) for providing subsidized food to targeted groups are being implemented to guard against hunger and malnutrition.

The most important factor that keeps Public Distribution System alive is implicit subsidy. It is stated that the poor spends almost 80 percent of their income on food (Vyas & Bhargava, 1995). Hence, only less portion of the income is spent on non-food items especially like health and education which could have raised the national output in the long run. The evaluation study done by Niti Aayog (2016) includes the value of the subsidy for calculating changes in per capita food expenditure among BPL and Non BPL households between 2004-05 and 2011-12 clearly points to the fact that the BPL/AAY households incur lower food expenditure than their non-BPL counterparts among the households that experienced income stability or growth, suggesting that PDS has significantly contributed to reduce food expenditure of BPL/AAY households and it poses the possibility of diverting saved income on non-food items.

1.2 Statement of the Problem

India has been appreciated for achieving high growth rates in the 1980s but criticized for failing to create employment and for increasing economic inequality. It has been observed

that the factors like agrarian stress, jobless growth in manufacturing sector which is accompanied by a growth in casual and informal employment, and increased cost on higher education are considered to be responsible for rising inequality. Most of the previous studies have analysed household expenditure as a whole by taking into account consumption expenditure in terms of social and regional dimensions. Added to that, change in the composition of the household budget due to other than above mentioned dimensions is evident in the recent surveys of NSSO. The trend in spending on non- food items like health and education is also varied in a larger way in the household budget. The independent analysis of consumption expenditure survey of NSSO over a 25-year period from 1987-88 to 2011-12 found that the relative inequality within the food and non-food has declined over a period of time both in urban and rural areas, even though overall expenditure inequality has increased. The observed rise in overall expenditure inequality is due to increased weight in the household budget of non- food spending (Basole & Basu, 2015). Thus, it is possible that PDS can be partially responsible for such observed pattern of reduced inequality between food and non-food expenditure. During this time period, Public Distribution System was institutionally formed and expanded the coverage of beneficiaries. Another important element found in literature that beneficiaries could realize some amount of money by purchasing subsidised food items from PDS (Jha et al., 2013; Mooij, 1999). Therefore, the question is, in the recent periods, how PDS has diversified the consumption behaviour of households? Whether it ensures adequate food for BPL families? To what extent does it enable households to balance food and non-food consumption expenditure through implicit subsidy? Since PDS provides subsidised food, is there any difference in consumption expenditure between priority households and non-priority households? What are the factors responsible for PDS consumption? Lastly, does PDS bridge the differences in consumption expenditure of priority and non-priority households? All these questions are about the efficiency of PDS to ensure

food security and shift from food to non-food consumption. In this context, the present study is proposed to be undertaken to analyse the efficiency of PDS to ensure food security and the role of PDS on changing consumption behaviour of BPL households towards the non-food items.

1.3 Objectives of the Study

1. To outline the performance of PDS at macro level.
2. To examine the efficiency of PDS in ensuring food security to the beneficiaries.
3. To analyse monthly per capita consumption expenditure of priority and non-priority households.
4. To estimate expenditure elasticity for both food and non-food items across the ration cards.
5. To investigate food and non-food consumption inequality between priority and non-priority households.
6. To identify the factors affecting off take of commodities from the fair price shop.
7. To explore how access to PDS enables BPL families to spend subsidized income on non- food items.

1.4 Hypothesis of the Study

1. H_0: There is no significant differences in PDS consumption between food secure and food insecure households
2. H_0: The PDS is not efficient enough to ensure food security to the beneficiaries.
3. H_0: There is no significant difference in food expenditure across the ration cards.
4. H_0: There is no significant difference in non-food expenditure across the ration cards.
5. H_0: PDS off take is not affected by socio-economic factors

6. H_0: Implicit subsidy through PDS does not help BPL families to spend on non-food items.

1.5 Theoretical Framework

There are different approaches discussed in literature to analyse the concept of food security. The first approach is the "food availability" approach. The core ideas of the approach could be the contributions of Giovanni Botero (1588), the Venetian thinker; and it was Thomas Malthus who in fact, popularized it. Therefore, it is also regarded as the Malthusian approach. The approach mainly focused on stability between food and population. According to this approach, to maintain equilibrium, growth rate of food availability should not be less than the growth rate of population. Accordingly, food security is merely confined to aggregate (per capita) food availability.

Second approach is the "Income-based approach". Recognizing that economy consists of three interdependent sectors, food security cannot be perceived as exclusive problem of agriculture or food sector. Therefore, this approach tries to include analysis variables such as GDP/economic growth to measure the problem of food security. The shift from food availability at macro level to income at micro level is due to the contributions of Reutlinger & Selowsky (1976) and Haq (1976). This attempt is similar to income as a measure to assess the poverty. Food security is implicitly assumed to be sub-category of poverty which is often referred as food poverty i.e. lack of enough income to buy adequate food at the given living conditions(Sibrian, 2008).

Third one is "Basic needs approach". This approach was initially proposed by the International labour Organization as a new model of development with the intention of incorporating non-economic dimensions of development(International Labour Office, 1976). Later, the two economists Streeten and Stewart re-launched this approach(De Muro &

Burchi, 2012). The question of ‘what are the items to be considered as basic needs’ led to the emergence of new approach called ‘food the first’. This approach concentrates on whether people have enough food to eat.

Fourth approach is “Entitlement approach’. This was developed by Amartya Sen at the beginning of 1980s. It is contributed to shift the focus from food availability to access to food. “The entitlement approach concentrates on each person’s entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to any bundle with enough food”(Sen, 1981).

Fifth one is “Sustainable livelihoods approach”. It is basically general approach to poverty and development. There are two unique features of sustainable livelihood approach that has some advantages over previous approach in the analysis of food security. Firstly, its long term perspective and secondly, attention to socio-economic, political, physical and cultural aspect. Combination of these two features along with the study of household assets provides comprehensive framework for the analysis of food security (De Muro & Burchi, 2012).

As far as well-being of households is concerned, it is important to understand how households make choices among various options available to them by allocating their resources. Consumer’s preferences are well explained in the literature related to micro economics (H. L. Ahuja, 2017; Babu et al., 2017). Households involve in various activities depending upon the human and physical resources they have. Initially they engage in activities which derive immediate satisfaction, can be referred as ‘consumption activities’. Consumption can take place either in terms of food or non-food items. Households aim to maximize their satisfaction with minimal resources which are subject to certain constrains such as socio-economic, technical and legal. Considering this how does a household make optimal choice between food and non-food items? In other words, it is a question of

nutritional choices that a household has to make. It is basically depends on an attribute: the choice between food and non-food commodities that they are willing and afford to buy, given their income and market prices of commodities. Among constraints mentioned above, economic or budget constraint is the crucial one. Let us see how budget constraint will be the obstacle to meet a household nutritional requirement. For simplicity we consider rice as food item and clothing as non-food item.

Let $p_f$be the market price of a food item, and p_n be the price of a non-food item. Let q_f and q_n be the quantities of food and non-food items. The total household income spent on these two items is denoted as *Y*. The possible combination of food and non-food item that can be purchased by a household is given:

$$p_f q_f + p_n q_n = Y \qquad (1)$$

The household preferences can be expressed by a utility function:

$$U(q_f, q_n) = a \qquad (2)$$

Where a is constant in ordinal sense. It also takes following form:

$$U(q_f, q_n) = xy = a \qquad (3)$$

Marginal Rate of Substitution (MRS)

The concept of marginal rate of substitution is useful tool to understand consumer's behaviour. At the present study context, the slope of marginal rate of substitution (MRS) represents the rate at which a households exchange food for non-food item. The declining marginal rate of substitution reveals the state of relative satiation. It indicates that more of

good Y that a household possesses relative to good X, it will be willing to give up less of good X to acquire more of relatively abundant good Y (Bryant & Zick, 2005).In other words, more of food items that a household possesses relative to non- food item, it will be willing to give up less of non- food item to acquire more of relatively abundant food item i.e. the amount of non-food item that a household willing to give up to get additional unit of food becomes smaller and smaller. For example, in the context of present study, as government provides subsidised rice to households, households will have relatively more quantity of rice than basic non-food items. Hence, we assume that they will give up less of non-food item to have additional unit of rice. On other hand, if households do not utilise obtained subsidised rice for their consumption purpose for some reasons, they will be willing to give up their non-food items in order to purchase rice from the market. This result in loss of money spent by government and locks the households in a vicious cycle of poverty.

The marginal rate of substitution is:

$$MRS = \left(\frac{\Delta n}{\Delta f}\right) = \left(-\frac{MUqf}{MUqn}\right) \quad (4)$$

A household will be in equilibrium when it leaves with no tendency to change its purchases of goods. It is given as follows:

$$MU_f/P_f = MU_n/P_n \quad (5)$$

Where MU_f and MU_n represents the marginal utility of food and non-food items respectively.

The household income along with the prices of commodities serves as constraint on household's choices. It can be expressed as follows:

$$p_f q_f + p_n q_n \leq Y \quad (6)$$

When government supplies cereals at subsidised rate the income of households increases (Southworth, 1945).

According to Dreze and Sen, entitlements, in wider sense, are not only to embrace food intake but also guarantees access to health and education (the social environment)(Watts & Bohle, 1993).Therefore, the present studies focuses on how subsidised entitlements enable households to spend saved income on basic non-food items. The Engel's curve explains that as the family income increases, proportion of spending on necessities such as food falls and spending on luxuries increases. In other words, poor households spend relatively more on necessities whereas rich families spend large portion of their income on luxuries. With help of Engel's curve we can analysis how Below Poverty Line (BPL) families spend their saved income on non-food items.

1.6 Conceptual Framework

In the present study, three major concepts are incorporated: Public Distribution System, Food Security and Non-Food Expenditure.

- **Public Distribution System:** It is a food distribution system at subsidised price established under the ministry of consumer affairs, food and public distribution system. It operates under the joint responsibility of state and centre governments. It helps in ensuring food security and stabilizing food price by providing food at affordable price. Added to that it maintains buffer stock of the food grains and redistribute food grain from surplus region to deficient region.
- **Food Security:** Food security is a dynamic concept originated in the mid- 1970s, primarily focussed on supply side of food grains i.e., assuring the availability and

to some extent, the price stability. But after the extensive examination of food crisis issues, the concept of food security was redefined, which recognized that the behaviour of the potentially vulnerable and affected people is a critical aspect. The World Food Summit 1974 defined food security as "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices". Later, in 1983, FAO expanded the concept to include ‘securing physical and economic accesses and ‘safe and nutritious food, food preferences' in 1996. In 1986, World Bank Report on "Poverty and Hunger" focussed on enough food for ‘an active and healthy life'. The UNDP Human Development Report promoted food security as human security is closely related to human right perspective. In the report, FAO(2008) defines food security in terms of following aspects: food availability, access, utilization, vulnerability. The National Food Security Act (NFSA), 2013 adopted human life cycle approach to define the food security as "ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity. Thus, the food security, in general sense, is the availability of adequate food grains to meet the domestic demand as well as access at the individual level to adequate quantities of food at affordable prices to live a healthy and dignified life. It is understood from the above definitions, food availability, accessibility and utilization are the pillars of food security.

In India, the National Food Security Act, notified in 2013, marked a paradigm shift in the history of the food security programme. It is a transition from a welfare approach to a rights-based approach. The legislation confers a legal right on beneficiaries to obtain entitled quantities of food grains at highly subsidized prices. It also extended legal rights to women and children and other unprivileged groups including the destitute, homeless,

disaster- and emergency-affected people living in starvation for free meals or meals at an affordable price. Under NFSA, ration card holders are classified into two categories: Priority households, Antyodaya Anna Yojana and Non-priority households.

Non-Food Expenditure: Non-food expenditure is the expenditure on items other than food items such as health, education, electricity, clothing, rent etc. As the household real income grows, there will be an expected shift in the composition of household budget i.e., an increase in the share of non- food expenditure and the decrease in the share of food expenditure(Attanasio & Pistaferri, 2016). If consumption expenditure is shown directly as a proxy for welfare, increase in non-food expenditure on education and health could be interpreted as a positive development. It would be a better indication of increasing purchasing power of the population. Here, increased purchasing power at present study context is monetary return from PDS purchase.

1.7 Scope of the Study

The present study is focused on efficiency of PDS in ensuring food security and how access to PDS enables BPL households to manage non-food expenditure. The study will make a broad perspective of efficiency of PDS, distribution, consumption behaviour of PDS beneficiaries of Dakshina Kannada District. The relevance of food security and non-food expenditure on welfare perspective also examined. The adequacy and quality of commodities from PDS are the other issues included in the study. The study incorporates demand and supply side analysis of PDS based on the beneficiaries' perspective.

1.8 Significance of the Study

This study would be a significant input in understanding the changing dimension of food policy in the existence of diversified consumption attitude. This study will be useful to find

the perspective of households on performance of Public Distribution System. Thus, one can assess the satisfaction level of the beneficiaries. By understanding the need of Public Distribution System for priority households, the government can improve health and educational status the households by allotment of adequate food grains and thereby make the country to move on 'golden age path' i.e. the maximum amount of per capita consumption. This, in fact, reflects the welfare of the people. The result of this study would act as a feedback to the policymakers so that they can correct shortcomings and thereby improve the efficiency of Public Distribution System.

1.9 Methodology of the Study

1.9.1 Data Sources and Collection Methods

The proposed study is analysed by applying appropriate statistical tools based on Primary and Secondary data.

Primary Data

The present study requires the collection of primary data from the PDS beneficiaries to analyse efficiency of PDS at the micro level. The multi-stage sampling method is followed for the collection of data. The required data are collected from the households of the study area through administering a structured interview schedule.

Secondary Data

Secondary data used is obtained from published and unpublished sources to make analysis meaningful. It is mainly collected from the reports of FAO, World Bank, NITI Aayog, Ministry of Consumer Affairs, Food and Public Distribution, NSSO, annual surveys of

Central Statistical Organization, Panchayat, and other related reports, journals periodicals and websites.

Statistical Tools

Statistical tools used to analyse the data were SPSS and R-Studio

1.9.2 Description of the study area

The study will be conducted in Dakshina Kannada which consists of five taluks namely, Bantwal, Belthangady, Mangaluru, Puttur and Sulli. Mangaluru city is the district headquarters and the main city of the district. Public Distribution System of the district works through the network of 454 ration shops having 408164 ration card holders (DSO, 2021). The rationale behind the selection of the district has been based on developmental perspective.

1.8.3 Justification of the Study Area

The selected district for the present study is Dakshina Kannada district which is one of the top developed districts in Karnataka according to the Human Development report 2014. It belongs to the category of income-rich and capability-rich districts based on the relationship between economic and human development.. According to the recent Karnataka HDI report, the district was ranked second in the Human Development Index (HDI). It was ranked second in the Food Security Index (FSI). Since Dakshina Kannada shows better performances in all these indices of HDI, it is an appropriate district to select for analysing the efficiency of PDS in ensuring food security and to what extent access to PDS enabled BPL beneficiaries to balance food and non-food expenditure. Increased spending on non-food expenditure is the indication of welfare of the region. Secondly, even though respective district is one of the well performing districts, more than half of the households belong to priority households which constitute 61.51 percent of total households in the district.

1.9.4 Sample Distribution

The study sample has been selected from PDS beneficiaries of Dakshina Kannada District. Following multi stage random sampling, study selected two talukas namely Mangalore and Belthangady. Talukas are selected based on highest and lowest HDI ranking districts to have equal representation of developed and less developed talukas. From Mangalore District, Konaje, Asaigoli, Inoli and Gramachawdi are selected. Similarly, Kalanja, Kayathadka, Kanyadi I and II are selected. The sample size is estimated using Yamane's formula(R. Ahuja, 2001; Israel, 1992) which is given below:

$$n = \frac{N}{1+N(e)^2}$$

Where

n= sample size

N=Population size

e=level of precision which is at 5 per cent level

Based on the above formula, the sample size is estimated to be 400households to meet the adequate representation. Out of 400, sample size is estimated for APL, BPL and AAY separately in selected talukas. Approximate number of households to be selected in each Taluk is estimated based on the formula given below:

$$Total\ Households\ \ to\ be\ selected = \frac{\Sigma x_i}{\Sigma X} \times n$$

Where

Σx_i = Total Number of households in i^{th} Taluk

ΣX= Total households in selected District

n= Sample size. Based on calculation, proposed study selected 154 APL households, 224 BPL households and 22 AAY households. Based on Sample size calculated study selected, sample size is calculated from selected talukas: Mangalore and Belthangady.

1.9.5 Analytical Framework

The methodology used in the study involves both analytical method and statistical tools. The analysis is made with the help of relevant statistical tools such as Simple Averages, standard deviation, non-parametric tests- Kruskal Wallis test, Structural Equation Model, Dummy Variable Regression Analysis, inequality measures, Lin-log Model and Log-Linear model. The analytical method is used to interpret the results especially in case of trend analysis. The collected data are processed and presented in the form of tables and figures.

Model Specification:

Structural Equation Model (SEM): SEM is an extension of General Linear Model (GLS) that enables researcher to combine set of relationships between one or more endogenous and one or more exogenous variables. In the study, SEM is applied to measure the efficiency of PDS in ensuring food security. As food security is directly unobservable and involves too many latent exogenous variables, SEM is the appropriate tool to measure the impact of PDS on food security. Structural relationships among unobserved variables can be expressed in the following way:

$$\Gamma n_i \quad = \pi \xi_i \varepsilon_i$$

$$(N \times N)(N \times 1)(N \times M)(M \times 1) \quad (N \times 1) \qquad (1)$$

Where vector n_i represents the *i*th case of *N* unobservable endogenous variables, ξ_i is the *i*th case of *M* unobservable exogenous variables, and ε is the *i*th case of *N*structural disturbances. A measurement model connects latent variables to their observable indicators:

$$y_i = \varphi_y + \omega_y n_i + \delta_i$$

$$(R\times 1)\ (R\times 1)\ (R\times N)\ (N\times 1)\ (R\times 1) \qquad (2)$$

$$x_i = \varphi_x + \omega_x \alpha_i + \varsigma_i$$

$$(S\times 1)\quad (S\times 1)\quad (S\times M)\ (M\times 1)\quad (S\times 1) \qquad (3)$$

Equations 2 and 3 specify that R measurements in y_i are linear functions of latent endogenous variables (*N*) plus a vector of means φ_y, and a vector of disturbances δ_i . Similar structure is found in relation to S indicators of exogenous variables, *M* latent exogenous variables and a vector of disturbances (Bielby & Hauser, 1977).

Dummy Variable Regression Model: Dummy variable regression model is applied to analyse the impact of socio- economic variables on PDS off-take. To see this, following model is considered:

$$Y_i = \varphi_0 + \varphi_1 D_i + \cdots + \mu_i \qquad (4)$$

Where Y_i is the dependent variable, D_i represents all dummy variables included in the models and μ_i is residual term.

Log-Linear model: Log-Linear model is used to estimate the expenditure elasticity. Slope coefficient measures the elasticity of dependent variable(Y) with respect to explanatory variables which may be expressed as

$$ln\, Y_i = \alpha_0 + \alpha_1 ln\, X_i + \mu_i \qquad (5)$$

Where $ln\ Y_i$logarithm of dependent variable is, $ln\ X_i$ is logarithm of explanatory variable and μ_i is residual term.

Lin-Log Model: It is used to estimate absolute change in dependent variable (Y) corresponding to the percentage change in explanatory variable (X). It can be expressed as

$$Y_i = \lambda_0 + \lambda_1 ln\ X_i + \mu_i \qquad (6)$$

To interpret slope coefficient

$$\lambda_1 = \frac{dY}{dX} = \lambda_1 \left(\frac{1}{X}\right)$$

Therefore,

$$\lambda_1 = \frac{dY}{\frac{dX}{X}}$$

Symbolically, we have

$$\lambda_1 = \frac{\Delta Y}{\Delta X/_X}$$

1.10 Chapter Scheme

Chapter-1: Introduction- Introductory chapter presents the status of Public Distribution System in India. It also highlights the statement of the research problem, objectives of the research, methodology, scope, and significance of the study.

Chapter-2: Review of Literature outlines a thumbnail sketch of the literature of earlier research studies conducted in this field.

Chapter-3: Public Distribution System in India: A Macro Perspective provides glimpse of the PDS and consumption pattern of priority households.

Chapter-4: Demographic and Socio-economic Profile of Study Area describes socio-economic, demographic characteristics of the sample area and sample population.

Chapter-5: PDS and Food Security provide sample description, results of the study in terms of food security through PDS.

Chapter- 6: PDS and Household Non-Food Expenditure gives results of the study in terms of food and non-food consumption pattern, food and non- food expenditure inequalities across the ration cards. And it gives a detailed picture of the role of PDS in balancing food and non-food expenditure of rural households.

Chapter-7: Summary and Conclusions gives a capsule of the major results and discussions.

2. Literature Review

To find the impact of PDS in ensuring food security in India, various studies have been undertaken by many researchers all over the world. Several studies show that PDS has significant impact on ensuring food security and reduction of poverty. Some studies have pointed out the loopholes and need for policy changes to enhance the effectiveness of PDS in ensuring food security. Few studies hint the capability of increasing disposable income or real income through PDS which can be used for bearing non-food expenditure. The review of so far undertaken studies has been broadly classified into following heads: Poverty and Food Security: 1. Need for Targeted Approach 2. Role of Food Assistance Programs in reducing poverty and Food Insecurity 3.Public Distribution System and food security 4.Performance of food assistance programs 5.Implicit income transfer through in-kind transfer: studies on non-food expenditure 6.Debate on cash v/s in-kind transfer 7.Leakages in food distribution programs 8. Studies on need for reforms in food assistance programs.

Tweeten (1999) outlined food security synthesis i.e., food insecurity traces to poverty. The study suggested that poverty must be addressed by promoting economic development with human resource investments and opening the opportunities for the disadvantaged, minorities, women, and others. Added to that, such development should include the provision of public goods and measures to correct negative externalities for sustainable progress Adelman & Berck (1990) suggests that status of food security can be improved by various developmental strategies which in turn raise the incomes of the poor. The analysis of Parthasarathy (1995) on reduction of rural poverty through various programmes in Andhra Pradesh proved that the rapid growth of agriculture production due to green revolution along with the initiatives taken by the government to provide basic needs at favourable prices particularly providing rice at Rs 2 per Kg contributed to the reducing poverty. Jones et al., (2013) describes measurement

tool need for measuring food consumption and dietary, household food accessibility and utilization, and to estimate status of food security at national level. Russell et al., (2018) identified that to measure food insecurity against household food expenditure, below poverty line is considered to be simple metric.

The study of Radhakrishna & Reddy(2004) reveals that India is failed to reduce food insecurity which in fact reflected in terms of poor energy intake and high incidence of malnutrition. The study of A. Kumar et al., (2012) observed that all dimensions of food security is interrelated. The study of (Omotesho et al., 2008) exhibits that household size, access to health facilities, and expenditure on food are the major determinants of food security status of household. The analysis of Kabbani & Kmeid(2005) also finds evidence on positive relationship between food assistance and food security. (Jensen (2002) shows that the food insecure households with higher participation in food stamp program spend less per person. The intensity of household food security is positively correlated with participation in food stamp program. Burchi et al., (2018) investigates the role performed by cash transfers in improving food security status of sub-Saharan Africa. It shows that cash transfer as a social protection scheme has potential to reduce monetary poverty and enhance purchasing power of the household. In the study of Anuradha (2018), savings of the household which is accessed to PDS rice was notable among the lower section of the population. Jensen & Miller (2010) observed that subsidising food created wealth effects and substituted for non- food. It is observed that intake of calories and several important vitamins of poor households in Hunan have reduced in response to the price subsidy.

In summary, the large number of studies has shown that PDS has the potential to enhance food security and also help beneficiary families to access food at subsidized prices. There are very few studies which have focussed to understand the access to food at subsidized prices

would really have reduced the burden of BPL families to purchase the food from the open market at higher prices and also to spend on non-food items. Therefore, it is necessary to know whether the food security through PDS a sustainable poverty alleviation strategy? If so, To what extent? Whether food distribution through PDS has enabled the BPL households to spend more on non-food items such as on education, health and others which significantly affects the human development at the household level, are the some of the important questions still need to be answered. The above review does not provide conclusive evidence to answer these questions therefore there is need to study non- food expenditure behaviour of BPL households in the context of PDS and food security for better policy perspective.

3. Findings and Suggestions

Understanding the concept of food security is challenging. Several economists question whether it even has a clear meaning. Food security is often defined as the situation of having sufficient access to a range of affordable and wholesome foods. Poverty and food security have a mutually reinforcing effect on the process of economic development. It is abundantly obvious from the literature that the issue of food insecurity resulted from the ongoing danger of famine and persistent hunger. We must approach these problems in a unique way. It is preferable to ask the question of how to escape from hunger and poverty rather than how to deal with them. Institutional approaches and technological advancements can help to answer it in part. Here, the government may play a significant role in addressing the issues of poverty and food security. The Public Distribution System is one of the significant policy efforts that

the Indian government has undertaken (PDS). Via this, the government gives food subsidies to low-income households which in turn indicate that adding money to the poor's pockets by purchasing food grains with subsidies. In other words, PDS usage demonstrates its ability to increase recipients' income, allowing them to increase their available cash flow by adding the money they would have otherwise spent on less expensive cereal. The money saved by using PDS may theoretically result in two different outcomes. Other food items like milk, fruits, and so forth may be consumed in households who emphasise dietary diversity (income effect). For households with other major consumption requirements, money saved by consuming subsidised cereals could be used on non-food products (substitution effect). Which of these two effects predominates is still a matter of empirical debate. The suggested study sought to comprehend the function of PDS in guaranteeing food security and the degree to which PDS contributes to the cost of non-food products. The PDS greatly increases the priority households' access to food security, but it has less of an impact on non-food items, despite the positive coefficient value.

3.1 Summary of the Findings

3.1.1 General Observation of the Sample Households' Socio-Economic and Demographic Profile:

i. It has been found that the majority of the sample households are Hindus (66.5 per cent) followed by Christian (26.5 per cent). Again 54 percent of sample households belong to Other Backward Class which is the highest followed by general category (20.75 per cent).

ii. Out of total sample population, male population comprises of 44.90 per cent and female of 55.10 per cent. The population pyramid shows that females and males in age group between 20 and 40 have greater representation.

iii. Majority of the sample households belong to nuclear family type which comprise of 89.25 per cent whereas 10.75 per cent of sample households are having joint family.

iv. Out of total sample households, it is seen that majority of the NPHH, PHH and AAY households is headed by males (71.25 per cent) and female headed households have 28.75 percent representation.

v. The income range of PHHs is between 0 and 1 Lakh and above, whereas that of NPHHs is between 0 and 8 Lakhs and above. Moreover, AAY's income ranges from 0 to 30,000 and higher.

vi. It has been found that the sample population as a whole has a primary education rate of 24.04 percent, which is the highest of all educational levels. Graduates come in second place with a 20.65 per cent share. Education in relation to other categories has the least representation. In addition, males have greater share in primary education (10.33 per cent), followed by higher secondary education (9.65 per cent). On the other hand, females also have greater representation in primary education (13.72 per cent),

followed by graduation (12.64 per cent). In terms of ration cards, 9.50 per cent of NPHH households have higher secondary education which is the highest whereas PHH households have greater representation in primary education (17.75 per cent). Also, a higher percentage of AAY households attend primary school (1.75 per cent). In terms of household head, male household heads have a bigger proportion in higher secondary education (16 per cent), whereas female household heads have a higher representation in primary school (6.25 per cent).

vii. It is known that men make up a bigger proportion of self-employed farmers (16.64 per cent), with daily wage work coming in second (8.90 per cent). On the other hand, daily wage job, which has the highest percentage of women (18.48 per cent), is followed by self-employment in agriculture (12.43 per cent). When it comes to ration cards, NPHH families have the highest rate of agricultural self-employed workers (14 per cent), and PHH households also have a higher percentage of agricultural self-employed workers (20 per cent). Also, a greater proportion of AAY households are made up of daily wage earners (2.25 per cent). In terms of family heads, male household heads are more likely to work for themselves in agriculture (26 per cent), whereas female household heads are more likely to work for a daily wage (6.25 per cent).

viii. It has been noted that out of the total sample households, the majority of NPHH and PHH households have pucca and semi pucca-style houses (27.75 per cent and 39.25 per cent respectively). Additionally, AAY households have semi-pucca houses (3.50 per cent). In addition, most of the NPHH and PHH households have three and above rooms which constitutes 36.25 per cent and 47.25 per cent respectively. Similarly, majority of the AAY households have single room (3.75 per cent).

ix. The majority of the NPHH, PHH, and AAY households utilise LPG as their primary source of cooking energy out of the total sample households. 36 percent, 42 percent, and 5 percent, respectively, make up this percentage.

x. The majority of PHH and AAY households utilise open wells for drinking water (34.80 per cent and 4 per cent respectively), while the majority of NPHH households use tube wells, which account for 28.30 percent of all NPHH households.

xi. It has been found that the bathing and latrine facility of majority of NPHH households (25.50 per cent) is attached to the house whereas of PHH and AAY households are separated from the house (41.75 per cent and 5.50 per cent respectively).

xii. It has been noted that the majority of NPHH, PHH, and AAY households do not own livestock. The percentages are 26 per cent, 31.50 per cent and 5.50 per cent, respectively.

xiii. It is found that most of sample households have no land ownership other than residential site. The highest percentage of land ownership among NPHH households (15 per cent) is between 1 and 5 acres, while the majority of PHH households own land up to 1 acre (7.75 per cent). AAY households also do not own land.

xiv. Percentage of females fallen sick is greater than the percentage of males during last two years. It is 52.17 per cent. It is observed that male population of NPHH (18.84 per cent), female population of PHH (34.78 per cent) and AAY households (5.80) have higher share in total number of family members fallen ill during last two years.

xv. Total number of deaths among males is greater than females. It is 50.85 per cent during last five years. It is understood that female population of NPHH (25.42 per cent), male population of PHH (33.89 per cent) and female population of AAY households (1.70 per cent) have greater share in total number of deaths during last five years.

xvi. Many PHH and AAY households received benefits of gas connection, latrine facility, house, electricity from the government during last five years.

3.1.2 Findings Based on Objectives

Objective 1: *The performance of PDS at macro level*

Findings of macro level study on PDS performance are:

i. Despite an overall rise in the availability of food grains, some households not perceived themselves as getting two square meals every day. The percentage of urban households not getting two square meals every day throughout the year is less than the rural households. Nonetheless, during the past 20 years, the proportion of households reporting not receiving two square meals per day has gradually decreased.

ii. Calorie consumption deficiencies are more prevalent in rural India than in urban India. It was estimated that inadequate calorie intake was 253.06 kcal and 22.9 kcal in rural and urban respectively in 2009-10.

iii. PDS rice consumption in rural households increased from 24.4 percent in 2004–05 to 45.9 percent in 2011–12, while PDS wheat consumption too showed an upward trend. From 11.0 percent in 2004-05, it was raised to 33.7 percent in 2005. In contrast, the consumption of wheat in urban areas rose from 5.8 percent in 2004-05 to 19.0 percent in 2011-12, and the rice consumed from PDS increased from 13.1 percent in 2004-05 to 23.3 percent in 2011-12.

iv. According to the monthly PDS entitlement consumption in 2009–10, Nagaland is the only state in rural India that consumes more PDS than the others. Similarly, Jammu & Kashmir, Mizoram, and Arunachal Pradesh are the states that use the most PDS entitlements in urban India. The three states in rural India with the greatest PDS consumption in 2011–12 are Tamil Nadu, Mizoram, and Tripura. The highest PDS

consumption states in urban India include Tamil Nadu, West Bengal, Tripura, Mizoram, Arunachal Pradesh, and Jammu & Kashmir.

v. The highest percentage change in PDS consumption has been seen in urban West Bengal and rural Rajasthan. States like Haryana, Assam, Jharkhand in rural India and Rajasthan in urban India have shown a moderate change in PDS consumption. The remaining states, both urban and rural, have not significantly varied.

vi. t-test for significant difference in PDS consumption between rural and urban area reveals that there is significant difference in PDS consumption between rural and urban PHH card holders. In addition, PDS consumption in rural area (Median= 12.58) is greater than PDS consumption in urban area (Median=5.78), U=201.50, ρ= 0.002. It indicates that difference is highly significant. Since p-value is less than 0.05, null hypothesis is rejected.

vii. The states such as Karnataka Andhra Pradesh, Chhattisgarh, Sikkim and Mizoram have gained more income from PDS consumption whereas states like Kerala, Tamil Nadu, Odisha, Jharkhand, Bihar, Uttar Pradesh, Himachal Pradesh, Jammu& Kashmir, Assam, Tripura and Meghalaya are moderately gained income from PDS consumption. States such as Maharashtra, Gujarat, Rajasthan, Madhya Pradesh, Haryana, Punjab, Uttarkhand, West Bengal, Arunachal Pradesh and Nagaland are gained less income from consuming PDS entitlements.

viii. It is found that in 2009-10, the states such as Tamil Nadu, Chhatisgarh and Mizoram have gained more income from PDS consumption; it is between Rs. 240.50 and Rs. 360.75 whereas states like Kerala, Karnataka, Andhra Pradesh, Odisha, Tripura, Sikkim, J& K, Meghalaya and Arunachal Pradesh are moderately gained income from PDS consumption. It is between Rs. 120.25 and Rs. 240.50. Remaining states are gained less income from consuming PDS entitlements. On the other hand, in urban

areas, states such as Tamil Nadu and Jammu & Kashmir gained more from PDS consumption; it is between Rs 248.99 and Rs 373.49. Similarly, states like Andhra Pradesh, Chhatisgarh, Mizoram and Arunachal Pradesh gained income between Rs 124.49 and Rs. 248.99 and the remaining states gained income less than Rs 124.49.

ix. In 2011-12, it is believed that in 2011-12, in rural areas, Tamil Nadu, Odisha and Sikkim gained more income between Rs 428.32 and Rs 643.56. Similarly, states such as Kerala, Karnataka, Andhra Pradesh, Chhatisgarh, Uttar Pradesh, Tripura, Mizoram and Jammu & Kashmir gained income between Rs 213.09 and Rs. 428.32 and the remaining states were gained income less than Rs 213.09. On the other hand, in urban areas, states like Mizoram and Jammu & Kashmir gained more income between Rs 330.61 and Rs 495.92. Similarly, states such as Kerala, Tamil Nadu and Chhandigarh gained income between Rs 165.30 and Rs 330.61 and the remaining states were gained income less than Rs. 165.30.

x. Between 2009–10 and 2011–12, states like Uttar Pardesh, Bihar, and Sikkim have highest percentage change in income gain from PDS consumption in rural region; it is ranging from Rs 199.77 to Rs 351.69. Similarly, percentage change in income gain from PDS consumption in states like Kerala, Odisha, Jharkhand, Tripura, Assam, Uttarkhand and Jammu & Kashmir is between Rs 47.86 and Rs. 199.77 and for remaining states, percentage changes in income gain from PDS consumption is less than Rs 47.86. On the other hand, in urban areas, state like Bihar experienced highest percentage change in income gain from PDS consumption; it is between Rs 265.87 and Rs 419.22. Similarly, percentage change in income gain from PDS consumption in states like Odisha, Tripura, Assam, and Uttar Pradesh is between Rs 112.53 and Rs 265.87 and for remaining states, percentage changes in income gain from PDS consumption is less than Rs. 112.53.

xi. The Gini coefficient shows that there is 0.65 per cent of inequality in income gained from PDS consumption.

Objective 2: *Efficiency of PDS in ensuring food security to the beneficiaries*

Findings are:

i. Minimum and maximum calorie consumption of an individual from NPHH card holder in a day is 1595.55 kcals and 6072.10 kcals respectively. Similarly, for an individual from PHH household, minimum calorie consumption is 1278.84 Kcals and maximum is 3807.14 Kcals. Further, minimum and maximum calorie consumption of an individual from AAY card holder is 1375.82 and 3547.84 respectively. Therefore, mean calorie consumption of NPHH is 3327.71 calories. On other hand, mean calorie consumption of PHH and AAY households is 2340.05 kcals and 3268.29 kcals. Noticeable fact is that mean calorie consumption of NPHH and AAY households is relatively greater than PHH households.

ii. It is observed that out of total sample households, 64 (16 per cent) households are found food insecure and 336(84 per cent) households are food secure. In terms of ration card holders, out of total food insecure households, 10(2.5 per cent) NPHH households, 50(12.5 per cent) PHH households and 4(1 per cent) AAY households are found food insecure respectively. On other hand, 124(38.5 per cent) NPHH households, 174(43.5 per cent) PHH households and 18(4.5 per cent) AAY households are found food secure respectively.

iii. It is seen that out of total food insecure households, 10 (2.5 per cent) NPHH households, 34 (8.5 per cent) PHH households and 2 (0.5 per cent) AAY households are marginally food insecure. Similarly, 12 (3 per cent) PHH households and 1(0.25

per cent) AAY households are moderately food insecure. Further, (1 per cent) PHH households and 1 (0.25 per cent) AAY households are found to be severely food insecure.

iv. Mann-Whitney U test result shows that there is significant difference in PDS consumption between food secure and insecure households. In addition, PDS consumption of households with food secure (M=40) is significantly greater than that of households with food insecure (M=20), U=509, ρ= 0.000. Since p-value is less than 0.05, null hypothesis is rejected.

v. The SEM result shows that relationship between availability and utilization and between utilization and accessibility is significant at 5 per cent level. Therefore, null hypothesis is rejected. In addition, it is understood that for one per cent change in availability, utilization will change by 17 per cent and for one per cent change in accessibility, utilization will change by 33 per cent respectively.

Objective 3: *MPCE on Food and Non-Food Items of Priority and Non-priority Households.*

Findings are:

i. It is known that the average spending of the three types of ration card holders varies greatly. Additionally, data demonstrates that among NPHH households, cereals, meat/fish, and pulses account for a greater portion of the MPCE on food than any other food group. The PHH households show a similar tendency. On the other hand, AAY households spend more on meat/fish, oil, as well as other vegetables altogether. On average these food items have made a substantial difference in how much NPHH, PHH, and AAY spend on food. NPHH, PHH, and AAY households, respectively, spend more on meat and fish and less on green leafy vegetables, roots, and milk when it comes to the range of expenditure on specific food items. Another fact is that

compared to NPHH households, PHH and AAY households are spending considerably less money on cereals. It might be because people are buying subsidized rice from ration shops. Moreover, the non-cereal food item basket has changed, placing a larger emphasis on meat, fish, fruits, and other vegetables, as well as milk. With the exception of sugar and oil, NPHH spent more per person on food than PHH and AAY. The average food spending for all items other than eggs and oil was higher for PHH households than AAY households, showing a similar trend.

ii. Out of the overall MPCE on non-food items, clothing and education have gained relative significance. Education, durable goods, and clothing carry more weight in the non-food basket among NPHH households. For PHH households, the largest portion of non-food consumption spending goes towards clothing and education, but for AAY households, the highest portion of non-food spending goes only towards education. The variation in non-food expenditure between NPHH, PHH, and AAY has been strongly influenced by the cost of these non-food goods. NPHH, PHH, and AAY households spend more on education and less on rent when it comes to the range of expenditures on certain non-food items. Another fact is that compared to NPHH households, PHH and AAY households spend much less on durable items. Moreover, the per capita spending of NPHH on all non-food items was higher than that of PHH and AAY. Similarly, between PHH and AAY households also, average non-food expenditure exceeded AAY households' non- food expenditure.

iii. Kruskal-wallis test result reveals that there is a significant difference in food expenditure across the ration cards, Chi square value (2, n=400) is 61.392, $p < 0.05$. Since p-value is less than 0.05, null hypothesis is rejected. Food expenditure is lower for AAY (M=1831.66) and PHH (M=3639.67) card holders than NPHH card holders (M=4619.11). Post-Hoc test is conducted to compare all three ration cards.

iv. Kruskal-wallis test result shows that there is a significant difference in non-food expenditure across the ration cards, Chi square value (2, n=400) is 112.632, $p<0.05$. Non- food expenditure is lower for AAY (M=1963) and PHH (M=5970) card holders than NPHH card holders (M=12077.50). Post-Hoc test is conducted to compare all three ration cards. It shows that difference in non-food expenditure between the ration cards is statistically significant at 0.05 per cent level. Therefore, null hypothesis is rejected.

v. The estimated Engel ratios for food and non-food items indicate that there is significant difference in MPCE for NPHH, PHH and AAY households. It is observed that education and meat and fish have higher Engel ratio in total consumption expenditure for NPHH, PHH and AAY households but percentage share is less for PHH and AAY than NPHH. On other hand, lowest Engel ratio for NPHH is on expenditure on electricity, for PHH is on expenditure on durable goods and for AAY is on durable goods and rent.

vi. Distribution of MPCE on Individual Food and Non-food Items by Ration cards:

(a) Most of PHH and AAY households spend upto two hundred rupees on cereals, is comparatively greater than NPHH households' spending on cereals.

(b) Only a few of the sample households include pulses as a staple food. It is observed that most of the NPHH, PHH and AAY households likely to spend up to hundred rupees for pulses.

(c) The majority of PHH and AAY households chose to spend up to twenty rupees on eggs, while the majority of NPHH households preferred to spend more than forty rupees.

(d) It has been noted that meat and fish intake are significant components of the diets of NPHH, PHH, and AAY households. The majority of NPHH households are

expected to spend more than 200 rupees, while PHH and AAY households choose to spend up to 300 rupees.

(e) It is observed that many of the sample households in the higher income group are not particular about purchasing milk despite allocating a respectable amount for the consumption of meat and fish. It is known that milk is frequently consumed erratically in many households. While the majority of AAY households spend just about 80 rupees, the majority of NPHH and PHH households spend up to 320 rupees.

(f) Other than AAY households, it has been found that NPHH and PHH households spend far less on root than they do on milk. While NPHH and PHH households tended to spend less than Rs 240 on a monthly basis, the majority of AAY households grouped in the 0 to Rs 80 monthly expenditure category.

(g) Throughout the NPHH and PHH household, the cost of green leafy vegetables is dispersed over the selected spending class. It has been noted that there is marginal difference between NPHH and PHH in terms of spending on green leafy vegetables. On the other hand, it is shown that AAY could not afford to spend more than Rs 240 on green leafy vegetables. When it comes to expenditure on other vegetables, a similar pattern is observed.

(h) The majority of the sample households opted to spend less than 320 rupees on fruits, regardless of the type of ration cards they had.

(i) Other than the expenditure class of Rs. 50 to Rs. 100, it has been noted that there is little difference between NPHH and PHH in terms of their spending on sugar.

Most of NPHH and PHH households are likely to spend less than 150 rupees. On other hand, most AAY households decided to spend less than one hundred rupees.

(j) Most of the NPHH, PHH and AAY households equally prefer to spend more on cooking oil compared to other food items. Therefore, expenditure on cooking oil for these three ration cards dispersed around the selected expenditure classes. It is noted that PHH and AAY households are not likely to spend more than 400 rupees.

(k) Majority of the NPHH, PHH and AAY households are likely to spend for clothing around 150 rupees per head.

(l) In terms of foot wear, most of the NPHH, PHH and AAY households fall under expenditure class of 50 to 100 rupees.

(m) For education, majority of the NPHH, PHH and AAY households spend around 500 rupees.

(n) Other than AAY households, most of the NPHH and PHH households likely to spend for medication around 100 rupees per head whereas AAY households spend around 50 rupees for medication.

(o) The large percentage of NPHH, PHH, and AAY households opts to spend roughly 100 rupees per head on pan, tobacco & intoxicants.

(p) The majority of NPHH households spend about 400 rupees per head on electricity, compared to PHH and AAY households, which spend up to 200 and 100 rupees per head, respectively.

(q) The large percentage of NPHH, PHH, and AAY households choose to spend about 100 rupees on durable goods.

(r) It has been noted that only few of the sample households bear expenditure on paying rent. Majority of NPHH, PHH, and AAY households belong to expenditure class of 0 to 1000 rupees.

(s) The large percentage of NPHH, PHH, and AAY households spend roughly 2000 rupees on miscellaneous items.

Objective 4*: Expenditure Elasticity for both Food And Non-Food Items Across The Ration Cards.*

It has been found that the difference in expenditure elasticity between NPHH, PHH, and AAY is minimal for the majority of the items. Except for AAY households, the expenditure elasticity of food items is significantly lower than that of non-food goods. According to the coefficient for each item, the demand for non-food products is less elastic for NPHH and PHH than food items. Demand for food items is comparatively more elastic in terms of AAY than non-food items. In addition, the households belong to higher income group spend relatively more on non- food items than that of poor households.

Objective 4: *food and non-food consumption inequality between priority and non-priority households.*

Inequality index results show that consumption expenditure is closer to line of equality i.e., relatively equal. In other words, the households who belong to lower income class have not experienced relative deterioration in consumption standard. It also shows that overall level of inequality based average monthly consumption expenditure is lower across the ration cards. Gini coefficients for non-food goods are higher than those for food items for households other than AAY households.

Objective 5: *Factors Affecting Purchase of Commodities from The Fair Price Shops.*

i. Karl Pearson's Correlation result shows that there is a moderate negative correlation exists between rice consumption from PDS and market and it is significant at 5 per cent level. It indicates that as the households increase consumption of rice from PDS, consumption of rice from market decreases.

ii. The dummy variable regression model results reveals that socio-economic variables such as family size and type of ration card (NPHH is the benchmark category) is significantly ($p<0.05$) affects the PDS consumption.

Objective 7*: Monetary Gain*

i. Kruskal-wallis test results reveal that there is a significant difference in consumption of rice across the ration cards at 5 per cent level of significance. Median consumption of rice for NPHH is less than the rice consumption of PHH and AAY households. It indicates that initiative of government to distribute free rice is successful to keep priority households at a par with non-priority households in consumption of rice.

ii. It is also found that around 15.04 per cent of total priority households exclusively depend on PDS distribution for rice consumption. Around 53.25 per cent of total priority households consume 0 to 10 per cent of total rice consumption from the market which has highest representation among sample households.

iii. In terms of monetary gain, it has been noted that majority of the priority households gain income between Rs 1500 and Rs 2000 which comprises of 30.9 percent. On the other hand, 2.8 per cent of priority households gain income implicitly around 500 rupees which is the lowest one.

vii. The estimated result of Lin log shows that an increase in PDS consumption of 1 per cent, on average, it leads to about 33.70 rupees increase in the non-food expenditure of priority households but it is not significant as p-value is more than 0.05. Added to

that, as value of R^2 is very low, just 3 per cent of variation in non-food expenditure is explained by monetary gain from PDS consumption of rice, therefore, model does not fit well.

7.3 Policy Implications

With reference to the above study results, following are the policy implications:

- Government may distribute food grains to beneficiaries on regional preference of food grains to utilize the program more efficiently.
- Government should direct ration shop keepers to distribute entitlement on daily basis to make purchase easy for working people.
- It is suggested to provide adequate quantity of food grains considering real requirement of quantity per person per day rather than just focusing on the family size. One suggested approach is that issuing smart card with an auto updation of chronological age on annual basis.
- To achieve hundred per cent off take, it is necessary to distribute quality food grains.
- There is need to provide information regarding stock and distribution on regular basis
- Ration shop must have proper infrastructural facilities such as sitting and toilet facility to facilitate women and aged people to take food grains from the shop.
- It is suggested to provide cash or food coupons rather than in-kind transfer to purchase food items of their preference. It will also reduce the cost of distributing food grains.

- It is suggested distributing necessary food items like food kit to poor rather than distributing only rice/wheat more than required so that it helps to save some amount of money meant for spending on food items.

7.4 Limitations of the Study

The study area is confined to only one district so that generalization of the results is limited. The data collection in rural areas is difficult as households are afraid of some policy changes. Therefore, they refuse to reveal genuine data. Another major limitation is that one part of questionnaires is qualitative in nature therefore it was difficult to extract appropriate answer.

7.5 Scope of Further Study

The major objective of the proposed study is to analyse the impact of PDS on food security and to what extent PDS enable priority households to save income to spend on non-food items. This study was attempted under eight objectives. No research work is complete in terms of all aspects. The proposed study analysed the impact of PDS on food security considering supply side factors from beneficiaries' perspective. The study has given less important on demand side factors from beneficiaries' perspective. Therefore, future study can focus on this aspect. Another study can be conducted on impact of employment generation programs on food security rather focussing only on PDS.

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Signature of the Candidate

Jincy Mathew M

Research Scholar

Signature of the Guide

Prof. Vishwanatha

Professor and Chairman
Department of Economics
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Workshops Attended:

- Attended on Research Methodology and Data Analysis using SPSS from 7th to 9th February held at St Joseph's College, Bangalore
- 10 days ICSSR sponsored workshop on Research Methodology for Social Sciences held at Department of Commerce, Mangalore University from 8th April to 17th April 2019
- Ten Days Capacity building workshop on Research skills and Methodology from 24th July to August 02 2019 is held at Education Department, Pondicherry University
- Three day national level workshop on Basic Econometrics from 13th to 16th November 2019 organised by Department of Economics, Mysore University.
- Ten Days workshop on Research Methodology for Social Science from 20th to 29th November 2019 is held at Indian Statistical Institute Bangalore.
- Three Days workshop on Time Series Analysis Econometrics from 5th to 7th January 2020 is organised by Indian econometrics Society held at Madurai Kamaraj University.
- Seven Days E-workshop on " Research Techniques and Applied Econometrics" organised by Department of Studies in economics, Davanagere University from 5th to 11th June 2020
- Online workshop on " Beyond the Covid-19 Pandemic: Policy Choices for Productive and Healthy India" organised by Department of Studies in Economics Davanagere University on 27th June 2020
- Four days E-workshop on "Econometric Methods: Theory and Practice" organised by Department of International Business, Alagappa University from 13 October to 16 October 2020
- Five Days E-Workshop on "Data and Statistics for Social sciences: Data Analysis Tools" organised by School of Education, Central university of Kerala from 27th to 31st October 2020.
- Workshop on "Structural Equation Modeling with AMOS &SmartPLS" from 8th - 9th April 2021 organized by Commacad.
- Faculty Development Program on "Econometrics – Time Series & Panel Data Analysis organized by Jaipuria Institute of Management, Lucknow Campus on July 08-10, 2021.
- Ten Days Research Methodology workshop organized by Central University of Kerala in October 18 2021
- Summer School on Econometrics with R organized by Kochin University of Science and Technology in August 2022.

Paper Presented:

- On "Food Security through PDS- A Sustainable Poverty Alleviation Strategy in India" in International conference titled "Fostering Economic Transformation Through Inclusive Business: Innovative and Inspire" organized by Center for Advanced Research in Financial Inclusion, School of Management Manipal on 22 February 2019
- Paper titled "The Public Distribution System- A Ray of Hope For Reducing Food Insecurity in India" presented in National Conference held at Tumkur University on 30th April 2019

- On “Impact of Climate Change on Agricultural Production: Is Public Distribution System an Economic Safety Net for Farmers in India?” in International Conference held at Central University of Kerala in on 2-3 March 2020
- On “Is PDS a Kind of Cash Transfer? A Study on Consumption Pattern of BPL Households in India” in National conference held at Mangalore University on 12 March 2020
- On “Supply Response of Food grain Production in India: A Panel ARDL← Approach” in Indian Economic Association conference held at Ranchi from 27 to 29th December 2022

Publication

- Research Paper titled “Food Security through PDS- A Sustainable Poverty Alleviation Strategy in India” published in Conference Proceedings book titled “Fostering Economic Transformation Through Inclusive Business: Innovative and Inspire” by Canter for Advanced Research in Financial Inclusion, School of Management Manipal on 22 February 2019. ISBN 978-93-5351-198-2.
- Research Paper titled “The Public Distribution System- A Ray of Hope for Reducing Food Insecurity in India” published in UGC listed “International Journal of Advance and Innovative Research” Volume 6, Issue 2(VI) April-June 2019. ISSN 2394-7780
- Published a chapter on “Impact of Climate Change on Agricultural Production: Is Public Distribution← System an Economic Safety Net for Farmers in India?” in book titled “Multidisciplinary Issues in Social Science Research”
- Research paper on “An Empirical Analysis of Supply Response of Food grains to Changes in Price: Evidence from India” (Published in Indian Economic Journal, Sage Publication).
- Submitted research paper on “Supply Response of Food grain Production in India: A Panel ARDL Approach” to Indian Economic Review, Springer Publication (in progress)
- Submitted research paper on “Is PDS a Kind of Cash Transfer? A Study on Consumption Pattern of BPL Households in India” to Indian Economic Journal (in progress)